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ABSTRACT

The purpose of this paper is to promote a problematic based upon the hypothesis of match and mismatch between teaching strategies and learning styles. Evidence is examined that supports the proposition that match and mismatch may be vital factors in evaluating teaching effectiveness. Classical experiments are extraneous to the debate because the traditional laboratory controls exercised over what may be common teaching variables tend to limit the applicability of research findings to normal classroom settings. Conversely, the extent of the variables observable in non-experimental research projects renders control something of an impossibility. It is argued, therefore, that the identification and categorization of learning styles may be of greater importance to curriculum designers and educational administrators rather than the establishment of learning factors observed in laboratory type "neutral" settings. (Author)

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MATCH AND MISMATCH : A TEACHING AND LEARNING PROBLEMATIC

David Freer

The purpose of this paper is to promote a problematic based upon the hypothesis of match and mismatch between teaching strategies and learning styles. Evidence is examined that supports the proposition that match and mismatch may be vital factors in evaluating teaching effectiveness. Classical experiments are extraneous to the debate because the traditional laboratory controls exercised over what may be common teaching variables tend to limit the applicability of research findings to normal classroom settings. Conversely, the extent of the variables observable in non-experimental research projects renders control something of an impossibility. It is argued therefore that the identification and categorisation of learning styles may be of greater importance to curriculum designers and educational administrators rather than the establishment of learning factors observed in laboratory type 'neutral' settings.

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Current research reports within the field of teacher education detail dozens of conflicting and contradictory accounts of what is assumed to be 'good teaching'. Good teaching is invariably difficult to categorise, has innumerable variables and appears to defy generality. Yet it holds a virtually unassailable position as the baseline for developing effective thinking in formal education from the pre-school level right through to the higher levels of tertiary learning.

Simplistic explanations of teaching as an information delivery system have become increasingly recognised as inadequate, as expensive experiments in compensatory schemes, linear designed programmes and similar innovations have been hard pressed to demonstrate cost-effective learning gains. The answer does not seem to lie in machines or packages and Clark's (1983) paper acknowledges that we tend to have a very high expectation of technology in regard to learning which is not easily justified by available evidence. What the technology can do is to provide effective and viable alternatives in specific situations rather than provide a global panacea of learning effectiveness.

The purpose of this paper is to promote a problematic based upon the hypothesis of match and mismatch between teaching strategies and learning styles. Evidence is examined that supports the proposition that match and mismatch may be vital factors in evaluating teaching effectiveness. Classical experiments are extraneous to the debate because the traditional laboratory controls exercised over what may be common teaching variables tend to limit the applicability of research

2 / findings to normal ...

findings to normal classroom settings. Conversely, the extent of the variables observable in non-experimental research projects renders control something of an impossibility. It is argued therefore that the identification and categorisation of learning styles may be of greater importance to curriculum designers and educational administrators rather than the establishment of learning factors observed in laboratory type 'neutral' settings.

The research basis that I have adopted in examining this notion of match and mismatch is far from classical and owes allegiance to the approach promoted by Hamilton and others (1977) in what might well be regarded as a major seminal work in the development of illuminative evaluation. Illuminative evaluation is primarily concerned with description and interpretation rather than measurement and prediction. Origins for it probably lie in anthropology and history but it is also somewhat eclectic in that besides observations, interviews, anecdotal reports and document analysis it does not spurn many of the more traditional testing and crosschecking methods of conventional social science research.

This generalised and to many, less rigorous approach has gained credence in educational circles because it has become increasingly evident that an over-concern with quantitative data may miss significantly important links and relationships in an educative process. Without doubt some elements of an illuminative approach are impressionistic and subjective but it would be equally true to argue that an educational investigation conducted under the most rigorous of conditions and employing

3 / sophisticated statistical...

sophisticated statistical analyses is still open to prejudice in the choice of samples, choice of statistical methods and choice of analyses but above all by its attempts to isolate variables may be reporting an unrealistic scenario with little practical applicability. In contrast the more questionable and soft approach allows greater speculation and an arena for explanation. Rather than isolating and manipulating the key elements in teaching encounters this represents an attempt to explain what occurs in the vital gap between teacher and learner.

The traditional nature of teaching in the western world has been well documented by writers such as Flanders (1970), Edwards (1980) and Sirothnik (1983) who appear to concur on a rather depressing lack of change or adaptation in teaching strategies throughout the twentieth century. Flanders (1970, p 14), writing of USA schools, maintained

> 'teachers usually tell pupils what to do, how to do it, when to start, when to stop, and how well they did whatever they did'.

Edwards (1980) characterises teacher-pupil dialogue as frequently unbalanced because the teacher is able to ask questions, receive only the expected answers, ignore unwanted questions, interrupt while refusing to be interrupted and it is likely that classroom verbal interchange includes a further dimension in which some children may be inclined not to give answers because they perceive that the teacher already knows the answer. Edwards suggests that this is not because of a conscious attempt

4 / to make negative ...

to make negative moves but rather because children do not understand what is expected of them by way of a response. They may be having difficulty in matching their appreciation of the teacher's questions with the way they perceive other children responding.

A great deal of the literature on classroom research records a depressing continuity of classroom interaction that is essentially one-sided communication. Sirothnik (1983) gathered data from over 1 000 USA classrooms which demonstrated that children received approximately one-fifth share of any discussion that took place and that this one-fifth was sub-divided between 25 - 30 of them. Historically he was able to trace research evidence going back as far as 1912 which indicated that although classrooms had become more physically attractive, the normal pattern of teacher directed and dominated communication patterns had changed little in 70 years. His 1983 research noted that rarely did he find teachers providing what he terms 'corrective feedback'. In general he found that only 2% - 3% of the time spent on instruction was devoted to corrective feedback. The normal pattern is that of pupils responding to the teacher rather than the teacher responding to the pupils.

My own research into classroom interaction with data collected from 1981 onwards has attempted to explore the extent to which pupils, students, teachers and lecturers have a potential for interaction using a fairly simple coding strategy.

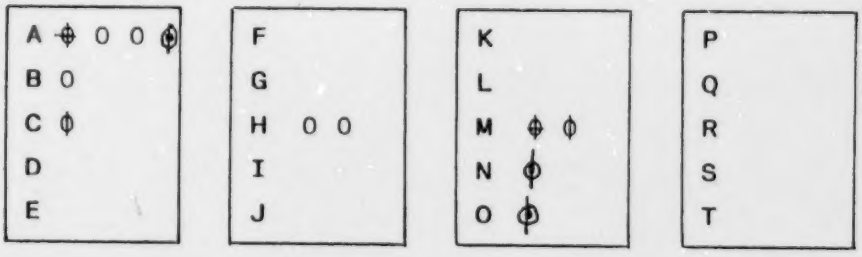
My observations were gathered on a systematic schedule basis in which I coded the length of pupil responses. Data on over 50 hours of classroom

5 / interaction involving ...

interaction involving 140 teachers and 3 200 children has been collected. The coding system was a progressive one in that as a pupil's individual response developed from a single word to a more extended reply the system would take cognisance of this.

A typical observation schedule

The diagram indicates 20 pupils sitting in four rows, 5 children in a row.



Points to note:

7 pupils made verbal statements -

ie A, B, C, H, M, N, O

Pupil A made the greatest number of responses commencing with two sentences, Φ followed later by a simple word O, then another single word response O and finally the pupil initiated a single sentence interchange with the teacher Φ.

Fundamental to the notion of systematic classroom observation is the need to establish an acceptable level of inter-observer reliability. Using

6 / the observation ...

the observation instrument, four scorers were placed in a variety of pairings and in a total of 126 minutes, a total of 295 items of spoken behaviour was recorded. Reliability was calculated in terms of agreement in identification of the pupils and agreement in categorising the observed behaviour.

Table of inter-observer agreement

Pairings	Agreement (%)
Observers A and B	81,8
Observers A and C	94,6
Observers C and D	90,4
Observers D and B	87,7

As the table demonstrates, inter-observer agreement was in the region of 90% for most of the pairings. The design of the coding schedule has its antecedents in an instrument devised by Puckett (1928) detailed in Mirrors for Behaviour III compiled and edited by Simon and Boyer (1974).

The starting point was in a survey of children's responses in primary

7 / schools in Soweto ...

schools in Soweto but is supported by data through student and lecturer observations of teaching encounters in Johannesburg, the Eastern Cape and by the use of the observation instrument overseas. Geographical location, class size and teaching intent did not appear to alter the contention that in a normal whole class encounter there is little time for an individual child to talk with his teacher. The teacher invariably dominates discussion and gains most of the benefits of the language experience.

In Soweto, for example, in primary classrooms where an enrolment of over 45 children was the norm rather than the exception, it became a virtual impossibility for more than a minority of children to engage in any meaningful verbal-interaction with their teachers. Surprisingly, in smaller classes in the relatively white privileged areas of northern Johannesburg and the Eastern Cape, many children did not appear to have the opportunity to verbally explore problem situations with their teachers. Even in the overtly more democratic atmosphere of the small sample of American classrooms observed in Chicago, a similar situation was apparent.

The conclusion to be drawn is that in normal class-teaching situations in which the teacher occupies the centre of the stage, there is neither sufficient time available nor a context which is conducive for all children to engage in meaningful verbal interchanges with their teachers. Yet these interchanges may be the only means available to teachers to enable them to develop some form of accommodation between learning styles and teaching strategies which may be at variance with one another.

8 / Examples of the distribution ...

Examples of the distribution of learners' verbal responses

1. **Whole class observations**

Region	Class	Discussion time	No in class	No of speakers	Proportion of speakers	No of utterances	Average no of utter's per member of class
Soweto	Std 3	20 mins	47	16	34%	34	0,7
N Joh'burg	Std 2	10 mins	36	17	47%	50	1,4
Eastern Cape	Std 7	15 mins	16	10	62%	14	0,9
Chicago	Std 3	16 mins	21	12	57%	29	1,4

2. **Small group observations**

Region	Class	Discussion time	No in group	No of speakers	Proportion of speakers	No of utterances	Average no of utter's per member of class
N Joh'burg	Std 2	13 mins	5	5	100%	65	13,0
N Joh'burg	Std 3	3 mins	3	3	100%	18	6,0
Wits Univ	New Tutors	25 mins	5	5	100%	126	25,2

For the purposes of this table an 'utterance' was a single recorded verbal statement which might range in length from a single word to several connected sentences. The average length of an 'utterance' was approximately one sentence.

The situation that I have reported appears to be a pessimistic one. In regard to normal whole class teaching encounters this was certainly the case. However, when observations were made of classes organised into small groups the probability of verbal interaction increased fairly dramatically. Obviously peer group interaction was facilitated but in addition when teachers joined a small group, all the members of the group then frequently had fairly prolonged verbal interchanges which held the potential for the teachers to assess a wide variety of learning problems.

Group discussions appear to encourage participants to investigate the way in which reponses are expected, in other words, they allow individuals to learn how to discuss or investigate a problem as well as how to solve it. It would be unwise to accept prolific peer group responses as indicative of effective learning but rather regard group interaction as having a potential for monitored discussion which would enable teachers to intervene and explore learning difficulties. This is a vital preliminary stage in establishing the accommodation necessary for effective learning.

This paucity of interaction between teachers and children, and, I suspect, between lecturers and students in large classes, led me back to investigations in which learning encounters were analysed in some detail and although I have re-interpreted the terminology of some accounts I have hypothesized that Hunt's (1960) notion of match and mismatch is central to understanding effective teaching.

Hudson (1970) in exploring divergent and convergent thinking in pupils and students indentified learning/teaching encounters in which some teachers

10 / and lecturers ...

and lecturers appeared to operate within totally different conceptual frameworks. He conducted a small-scale experiment within a London Medical School identifying an affinity between lecturers and students. Students were classified as divergent and convergent and divided into four groups. Each group contained an equal number of divergers and convergers. Four teachers were similarly identified in that two teachers taught in a straightforward expository manner and were categorised as convergent teachers, a third was considered marginally divergent and a fourth clearly divergent in that he taught in an exploratory manner, using patients to illustrate his points. Hudson found that the lecturers who were unambiguously identified - the two convergers and the one diverger - were much more effective when teaching students who appeared to match them, that is divergent students learnt more with a divergent lecturer and convergent learners learnt more with a convergent lecturer. The level of effectiveness was judged on the students' scores in their end of year examinations and tests.

Subsequent research reported by Pask and Scott (1972) analysed slightly different variables and offers a more complex explanation related to specific learning styles and specific teaching strategies.

In focussing on teaching strategies as well as learning styles Pask delineated a danger area in which effective teaching is more a function of the learner's organisational potential rather than the teacher's skill. He carried out a systematic series of experiments with relatively small samples of children and students which probed beyond the test level and

11 / in which he proposed ...

in which he proposed that two distinct forms of cognitive function may exist. He called these serialist and holist. The serialist learner tends to learn in a logical, step-by-step linear fashion which might be termed stringing. In contrast the holist learner structures learning into groups and makes a series of unusual associations, follows the highways and byways of knowledge and then assembles the groups of learning together into a coherent whole. He might be termed a clumper.

Pask took things a stage further when he examined the effects of teaching strategies that developed along either serialist or holist patterns. He found that if the teaching strategy and the learning style were both serialist or both holist then learning was greater than when mismatches occurred. In fact, the differences were so great that in a series of graded problem solving exercises, the lowest matched pairings of similar styles and strategies were higher than the highest mismatches. An interesting corollary to the problem solving sessions was observed by Pask. Students were invited to teach back to their tutors all the material and solutions they had learned. The serialists taught back virtually in the same format as they were taught but the holists even restructured the holist material they had been through.

Frequently 'remedial' action is taken which may scratch the surface of the problem of relating a difference in interpretation between teacher and learner. In many institutions fairly elaborate courses of study skills are introduced. In the few South African universities which have attempted to integrate black and white students such types of action

12 / have proliferated ...

have proliferated with little apparent effect. The idea of providing a 'cure all' course of study was attractive because it appeared administratively simple and financially undemanding but in retrospect to expect such courses to compensate for years of sub-standard schooling was optimistic to say the least. Even in such developed countries as Britain, there is a tendency to recognise that study skills are more likely to be effective if they involve a subject specific approach which leads the learner into a particular way of understanding.

Tabberer (1984/5) summarising his three year investigation in the 16 to 19 age group observes

> 'Discussion again highlighted the importance of everyday teaching and pointed towards study skills provision appearing as an integral part of subject teaching rather than as an isolated element in the timetable'.

If subject specific skills are essentials in the learning situation then it is not unreasonable to argue that students need to acquire modes of thought appropriate to particular subjects and it is likely that university teachers are rightly or wrongly assuming that such a mode has already been acquired. Penny (1984) reported on his extensive investigation with over 400 black first-year students to determine causes of first year success or failure. He used a traditional test battery, structured interviews and observations of students in lecture rooms.

13 / He found very little ...

He found very little to support the notion of a generalised study skill but argued that for success students and lecturers needed to have common meanings and a common value system so that generalisations and theories could be developed from shared understandings. This simply supports the argument for a learner-teacher match as the basis for effective learning. Unfortunately, recognising the extent of a learning match for students is not always obvious. Clarke (1980 p 4) makes the amusing but nevertheless pertinent comment that

> 'students tend to like that instructional method from which they learn the least'.

He is working in a slightly different domain from one of learner-teacher match but is nevertheless drawing attention to contrary learning styles that may be inappropriate for particular students. He goes on to suggest how this curious state of affairs can develop. He argues that low ability learners show a clear preference for permissive methods but achieve higher scores with more structured approaches. Conversely, high ability learners prefer more structured, directive methods but in actuality achieve greater learning gains from more open and permissive instructional approaches. Both ability groups seem to make inaccurate judgements about the efficiency of their efforts but the lower ability learners are more vulnerable through their incorrect choice. Clark suggests that whereas higher ability learners appear to make the learning task easier they are frequently duplicating the learning syles they have already acquired intuitively or unconsciously. Conversely the lower

14 / ability learners seem ...

ability learners seem to conclude that more permissive approaches are more enjoyable and require less effort than more directive methods, and in adopting the more permissive approach they do not provide themselves with effective learning styles.

Obviously here Clark has an example of a potential for learning success or failure related to ability levels rather than learning styles but a concept of match and mismatch can still be identified. What now appears to complicate the issue is that a learner may not easily perceive what is a good 'match'. Inevitably it may be necessary to have some form of independent judgement made after a fairly primitive detection of some form of learning breakdown. It could be that profiles of success and failure are necessary to identify what it is that students and pupils do in response to their teachers.

For example a recent study by Nye and others (1984) demonstrated how extensive note-taking by first year university students was a strong prediction of examination success for a group of psychology students. Turning the argument around, it would be interesting to know why many otherwise well motivated students failed to make notes. Nye's finding is surprising because of the consistency of the results which conflicted with much of the advice given by university lecturers who advised students against taking too many notes. Perhaps the academics are unsure of the factors that actively promote success! Certainly there is room for doubt about the advice frequently given to students in relation to study habits. Frequently student study guides in specific subject

areas argue for selective and concise note-making whereas Nye and her associates found consistently high correlations between the extent of the notes taken in a series of 75 lectures and success in both multiple-choice and essay type examinations at the end of the academic year.

At the University of the Witwatersrand an inter-faculty project has attempted to improve first year pass rates through the introduction of subject tutorials based around a computer-managed instruction programme. Using 8 Plato terminals made available for 12 subject departments a team of lecturers has been investigating the potential for improved tutorial support for students. The evidence so far accumulated is far from conclusive in terms of students' measured learning gains but certainly attitudes to the learning project have appeared positive.

Over 300 students, mainly first-years in the Faculties of Medicine, Engineering, Arts, Science, Commerce and Education, have been involved in what might be described as an electronic interaction learning programme. The one feature common to virtually all of the preliminary reports submitted by the course organisers is the extensive use that students have made of the notes files available on the Plato system. The notes files allow students to make comments in the system's memory that can be monitored by the course tutors. The next step has been for tutors to intervene in and respond to students' needs and this has been made possible by the provision for the students' notes file in the learning system. In a comparison between Apple programmes and microprocessers the students have shown a preference for Plato more apparently because

of the access to lecturers through the notes file than from the nature of the software itself. Consistently the appeal of the system in spite of instrumental problems related to the failure of the microwave-telephone linkage has been the positive attitude of the students to the facility which allows them to interact with, at a first level, the learning programme, but more importantly, with their tutors. In a report-back session the tutors related case histories of students' comments which they were able to follow up. Interaction seemed essential to both motivation and effective learning and further interaction is necessary to share the same cognitive understanding rather than develop social skills, in other words, interaction is vital to the process of matching learning styles and teaching strategies.

Arguably the corollary to successful interaction is that an accommodation takes place between the way a teacher presents knowledge and the manner in which a learner attempts to understand this presentation. The potential for a fairly comfortable mental accommodation exists when there is a match between a learning style and a teaching strategy because the learner and the teacher may be operating from the same set of rules without being consciously aware of this. However, the negative aspect of an easy accommodation must give rise for concern. There may be an important minority group of high ability children and students who are failing or at best not achieving their potential because they operate with a differing learning style to that of their teachers who may have a contrary set of rules that have been incorrectly perceived by the learners, in other words, a total mismatch.

17 / At an intuitive level ...

At an intuitive level every teacher must at times have been puzzled by the dichotomy in responses to a particular teaching session or a lecture which has been delivered. Most of us have been aware that what we have offered appears more palatable to some students than it is to others. I suggest that an intervening variable of match and mismatch is worthy of serious contemplation. The problem that follows is how to resolve situations of mismatch. Here I am relatively optimistic in that I believe that one of the great virtues of effective human communication is that it enables people to understand and to accommodate differences. But this communication must be allowed to function perhaps to a far greater extent than is considered normal in a teaching-learning encounter.

It is likely to be through increased provision for one-to-one or small group teaching encounters or alternatively through computer-assisted tutorials. Indulging in a little crystal-ball gazing, it is not too fantastic to prophecy a situation in which with a given body of content to understand and a series of problems to solve a student might be able to punch the right buttons so that the material is presented in a teaching strategy that matches his learning style and thus allows him a measure of control over the manner in which he is taught. If such a dream machine system is evolved I suspect it has human precedent in such ancient institutions as Oxford and Cambridge with their historical commitment to individualised teaching tutorials. In those human systems I suspect the individual is able to exert considerable influence over the manner in which he learns and tutors are easily able to modify their teaching strategies to arrive at an acceptable accommodation with their students.

18 / I am increasingly ...

I am increasingly enamoured of the analogy of the cog wheel as a paradigm for learner-teacher relationships. If cogs mesh effectively they turn together and so increase output or lighten the workload. There is transmission but it is a deep-seated transmission which reaches towards the centre. If the cogs do not mesh one will not turn the other. Similarly, if the cogs do not have compatible teeth they will fail to turn. One central cog can turn several subsidiary cogs but there is a limit unless the subsidiary cogs in turn transmit to second order subsidiaries. If the centre cog is too large in relation to the subsidiary smaller cogs the large one hardly moves and yet can produce frenetic speed in the smaller ones. Finally, if the teeth or the contact points of transmission are damaged then the turning action is intermittent and impaired rather than steady and even. Efficient cogs accommodate one another and the teeth are cut to ensure that this happens.

I have argued that the process of accommodation is fundamental to effectiveness and this is more likely to be achieved when teachers are able to recognise how their pupils or students are functioning. It appears axiomatic that this ideal becomes more of a possibility in one-to-one or small group encounters and may be unattainable for an important minority of learners in large lecture or class situations. However, if large groups have tutorial support either through computer-based systems or human resources then this may be a viable compromise solution. Effective teaching is elusive because I think it is related to individual human actions and individual human responses. A universal description and prescription may be an unattainable myth because the

nature of the content of the learning may be specifically related to the way an individual organises knowledge which may be compatible or incompatible with the direction and rules of the teacher. To maximise learning there needs to be either intuitive mesh or match and if not the teaching/learning encounter should provide for an accommodation to take place between the teacher and the taught. In particular a significant minority of learners may need tutorial provision to allow for this accommodation otherwise they may fail not through lack of ability but because the teaching they are receiving is singularly unsuited to their learning style.

20 / **References ...**

20 June 1984
/jrw

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